

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 18-41 are pending in the present application. Claims 18-37 are amended, and Claims 38-41 are added by the present amendment.

In the outstanding Office Action, the abstract was objected to; Claims 18 and 28 were rejected under 35 U.S.C. § 102(b) as anticipated by Niida et al. (*Adaptive Modulation using Space-Time Block Code Matrix*, 101 Inst. of Elecs., Info. and Communication Eng'rs, No. 682, Feb. 27, 2002, at 31-36, herein "Niida"); Claims 20-21 and 30-31 were rejected under 35 U.S.C. § 102(b) as anticipated by Ji et al. (*MIMO Channel Transmission with Antenna Selection and Optimum Power Allocation*, Inst. of Elecs., Info. and Communication Eng'rs, Mar. 3, 2003, at 622, herein "Ji"); Claims 22-23 and 32-33 were rejected under 35 U.S.C. § 103(a) as unpatentable over Ji in view of Hiroaki (Japanese Laid-open Publication No. 2000-188585 A); Claims 19 and 29 were rejected under 35 U.S.C. § 103(a) as unpatentable over Niida in view of Miyashita et al. (*Eigenbeam-Space Division Multiplexing (E-SDM) in a MIMO Channel*, 102 Inst. of Elecs., Info. and Communication Eng'rs, No. 86, May 17, 2002, at 13-18, herein "Miyashita"); Claims 24-25 and 34-35 were rejected under 35 U.S.C. § 103(a) as unpatentable over Niida in view of Ji; and Claims 26-27 and 36-37 were rejected under 35 U.S.C. § 103(a) as unpatentable over Niida in view of Ji and in further view of Hiroaki.

Applicants thank Examiner Mitchell and Supervisory Examiner Ton for the courtesy of an interview extended to Applicants' representatives on October 15, 2007. During the interview, Applicants' claimed invention was discussed. Further, claim amendments

clarifying the claims over the applied art were discussed. Amendments similar to those discussed during the interview are presented above.

Regarding the objection to the Abstract, the Abstract has been replaced and is now less than 150 words. Applicants respectfully request that this objection be withdrawn.

Claims 18, 20, 24, 28, 30, and 34 have been amended to clarify that the channel structure information indicates a structure of a space-division-multiplexing channel and a space-time-coding channel between transmission and reception antennas and to clarify that the channel structure information is returned. These amendments find support in the specification at least at the paragraph bridging pages 10-11 and at the paragraph bridging pages 13-14. Claims 18-37 have been amended to address cosmetic errors of form. No new matter has been added.

Applicants assert the patentability of the amended claims in light of the references cited in the outstanding Office Action. Independent Claim 18 is directed to a radio communication apparatus at a transmission side that includes a plurality of transmission antennas and performs a communication using at least one carrier. The radio communication apparatus includes, *inter alia*, a channel dividing unit configured to divide a transmission signal into a plurality of channels based on channel structure information returned from another radio communication apparatus at a reception side and indicating a structure of a space-division-multiplexing channel and a space-time-coding channel between transmission and reception antennas, and a space-time-coding unit configured to realize transmission diversity by performing a space-time-coding processing for each of the plurality of channels.

In a non-limiting embodiment, Figure 1 shows transmission antennas Tx1, Tx2, Tx3, and Tx4 (e.g., a plurality of transmission antennas), arrows leaving the pair Tx1 and Tx2 and

the pair Tx3 and Tx4 (e.g., a plurality of channels), and the SDM method and the STC method simultaneously in use (e.g., a structure of a space-division multiplexing channel and a space-time-coding channel) in communicating between transmission and reception antennas.

Turning to the applied art, Niida discloses an adaptive modulation scheme, typifying space-time-coding, to achieve efficient frequency use. In Niida, a receiver feeds back a communication condition to enable control of a number of symbol iterations to be made and of a communication rate. Moreover, as disclosed by Niida, symbol interference is prevented using a single receiving antenna.

The Office Action asserts that Niida discloses channel structure information indicating a method of structuring a multiple-input-multiple-output channel. Office Action, page 3, lines 4 and 5. The Office Action further asserts that this structure is disclosed at page 6, lines 12-14 of the Niida translation. At that location, Niida discusses rates of communication, not the *structure* of a communication channel. As discussed during the interview, Niida is silent regarding space-division-multiplexing. Thus, Niida does not teach or suggest “a structure of a space-division-multiplexing channel and a space-time-coding channel,” as required by Claim 18.

Accordingly, it is respectfully submitted that independent Claim 18 and each of the claims depending therefrom patentably distinguish over Niida. Additionally, independent Claim 28 recites features analogous to the features of Claim 18. Accordingly, Applicants respectfully submit that the rejections of Claim 28 and each of the claims depending therefrom are also believed to be overcome in view of the arguments regarding Claim 18.

Claim 20 is directed to a radio communication apparatus at a reception side including, *inter alia*, a channel-structure determining unit configured to determine a structure of a

multiple-input-multiple-output channel and to return channel structure information indicating a structure of a space-division-multiplexing channel and a space-time-coding channel between transmission and reception antennas that is a result of a determination to the communication apparatus at the transmission side.

Turning to the applied art, Ji discloses a system that selects transmitting antennas and optimizes power allocation. Ji accomplishes this goal through a four step process that ends with determining a combination of transmitting antennas and a power allocation and returning information about this information to a transmission side. Ji also discloses returning information related to transmitting antennas that achieve a maximum throughput in Zero Forcing reception.

The Office Action asserts that Ji discloses channel structure. Office Action, page 4, lines 4-6. The Office Action further asserts that this disclosure can be found at page 3, lines 14-17 of the translation of Ji. At that location, Ji discloses the determination of a transmitting antenna combination and a power allocation. Although Ji teaches a structure of *antennas*, as discussed during the interview, Ji does not teach a structure of a *channel*. Therefore, Ji does not teach or suggest “a structure of a space-division-multiplexing channel and a space-time-coding channel,” as required by Claim 20.

Accordingly, it is respectfully submitted that independent Claim 20 and each of the claims depending therefrom patentably distinguish over Ji. Additionally, independent Claim 30 recites features analogous to the features of Claim 20. Accordingly, Applicants respectfully submit that the rejections of Claim 30 and each of the claims depending therefrom are also believed to be overcome in view of the arguments regarding Claim 20.

Additionally, independent Claims 24 and 34 recite features analogous to the features of Claims 18 and 20. Therefore, regarding the rejections of Claims 24 and 34 as unpatentable over Niida in view of Ji, it is respectfully submitted that the cited references do not, either alone or in proper combination, cure the above-noted deficiencies in regard to independent Claims 18 and 20. Thus, Claims 24 and 34 are believed to be patentable for at least the reasons discussed above. Accordingly, Applicants respectfully submit that the rejections of Claims 24 and 34 and each of the claims depending therefrom are also believed to be overcome in view of the arguments regarding Claims 18 and 20.

Regarding the rejections of Claims 22-23 and 32-33 as unpatentable over Ji in view of Hiroaki, the rejections of Claims 19 and 29 as unpatentable over Niida in view of Miyashita, the rejections of Claims 25 and 35 as unpatentable over Niida in view of Ji, and the rejections of Claims 26-27 and 36-37 as unpatentable over Niida in view of Ji and in further view of Hiroaki, it is respectfully submitted that Hiroaki and Miyashita do not, either alone or in proper combination, cure the above-noted deficiencies of Niida and Ji in regard to independent Claims 18, 20, 24, 28, 30, and 34. Thus, dependent Claims 19, 22-23, 25-27, 29, 32-33, and 35-37 are believed to be patentable for at least the reasons discussed above.

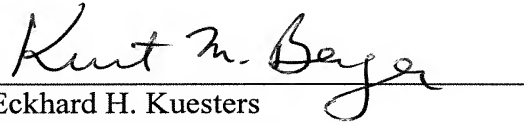
New Claims 38-41 have been added to set forth the invention in a varying scope, and Applicants respectfully submit the new claims are supported by the specification at least at the first full paragraph on page 8. No new matter has been added. Accordingly, it is respectfully submitted that dependent Claims 38-41 are allowable for the same reasons as discussed above with regard to Claims 18, 24, 28, and 34, from which Claims 38-41 depend.

Application Serial No.: 10/551,377
Reply to Office Action dated September 12, 2007

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully Submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

A handwritten signature in cursive script, appearing to read "Kurt M. Berger", is written over a horizontal line.

Eckhard H. Kuesters
Registration No. 28,870
Attorney of Record

Customer Number

22850

Tel. (703) 413-3000
Fax. (703) 413-2220
(OSMMN 10/01)

EHK:KMB:BRE:brf

Kurt M. Berger, Ph.D.
Registration No. 51,461